

**METHOD AND APPARATUS FOR CONTENT-LINKING SUPPLEMENTAL
INFORMATION WITH TIME-SEQUENCE DATA**

FIELD OF THE INVENTION

- 5 The present invention is directed to the field of delivering animation, audio and video data via broadcasting or network mechanisms, and in particular to systems for providing value-added content to animation, audio and video programming.

BACKGROUND

- 10 With the rapid advent of technologies such as digital multimedia, broadband networking, video on demand, and the Internet, large volumes of audio, animation and video data or programming are readily available to the public. This programming can be delivered to an audience by a multitude of ways including broadcasting, on-demand type systems, etc. However, there are not adequate mechanisms to distinguish
15 programming distributed in this fashion from traditional forms such as broadcast television or screened movies.

- There are several known systems which offer video-on-demand and pay per-view services. These systems afford an opportunity for serving the audience with additional
20 information about the programming. Existing mechanisms require the user to actively request any additional information. However, these mechanisms have a number of drawbacks. A first disadvantage is that a user must have adequate knowledge of their own to request any additional information. The information is not associated with the content of the programming. Still further, there is no guarantee that the user will
25 request and view the additional information that is available. This is a major impediment, particularly in advertising.

- In existing methods for normal TV broadcast situations to systems such as Synchronised Multimedia Integration Language (SMIL), Microsoft Netshow, MPEG-
30 4, etc., the programming is required to be created, or packaged, afresh along with the associated information into a single entity. This has a number of disadvantages

including a lack of flexibility and programmable control. Further, it cannot be done on the fly. If the associated information changes, the entire package must be redone. That is, additional information cannot be changed with online digital content or broadcast material in current formats, unless there is a repackaging and/or format conversions.

Thus, a significant disadvantage of such conventional systems is that they do not permit a service provider, who offers audio, animation and video data services, to associate additional information with the programming and provide the two without interfering with the programming production process. Existing systems also fail to provide additional information with the digital media content without changing the way in which the content is produced, stored, and/or distributed.

SUMMARY

The following aspects of the invention are directed to ameliorating or overcoming one or more disadvantages of conventional systems including those described above.

In accordance with a first aspect of the invention, a method is provided for presenting supplemental information and/or action with time-sequence data. The time-sequence data can be animation, audio, and/or video data. The method includes the steps of: providing time-sequence data; separately providing supplemental information, action, or both, from the time-sequence data; and linking the supplemental information, action, or both, with the time-sequence data during playback of the time-sequence data.

Preferably, the supplemental information and/or action is linked with the time-sequence data by a start time and a stop time, or a start time and a duration period.

Alternatively, the supplemental information and/or action can be linked with the time-sequence data by annotation information associated with the time-sequence data. Yet further, the supplemental information and/or action can be linked with the time-sequence data using on-the-fly content analysis of the time-sequence data during playback of the latter.

Preferably, the supplemental information and/or action is content-linked with the time sequence data. The time-sequence data can be provided by broadcast or via a network. The supplemental information and/or action is preferably provided remotely
5 via a network. It can include a displayed prompt with which a user can interact by user input and a link to a remote location. The link is more preferably a universal resource locator (URL). The following mechanisms can also be provided remotely via a network.

10 Preferably, the time-sequence data and the supplemental information and/or action are linked by a link mechanism. Two or more of the link mechanism, the time-sequence data, and the supplemental information and/or action are initially co-located at their source. Alternatively, two or more of the link means, the time-sequence data, and the
15 supplemental information and/or action are initially remotely located at one or more source locations.

In accordance with another aspect of the invention, an apparatus is provided for presenting supplemental information and/or action with time-sequence data. The apparatus includes: a device for providing time-sequence data; a device for separately
20 providing supplemental information and/or action from the time-sequence data; and a device for linking the supplemental information and/or action with the time-sequence data during playback of the time-sequence data.

In accordance with yet another aspect of the invention, a computer program product is
25 provided having a computer readable medium having a computer program recorded therein for presenting supplemental information and/or action with time-sequence data. The computer program includes: a module for providing time-sequence data; a module for separately providing supplemental information and/or action from the time-sequence data; and a module for linking the supplemental information and/or action
30 with the time-sequence data during playback of the time-sequence data.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention are described hereinafter with reference to the drawings, in which:

- 5 Fig. 1A is a timing diagram graphically depicting a linked combination of time-sequence data and supplemental information and/or action in accordance with embodiments of the invention;

- 10 Fig. 1B is a timing diagram illustrating the linked relationship of exemplary video, animation and/or audio data and four advertisements in accordance with embodiments of the invention;

- 15 Fig. 2 is a block diagram illustrating the functional modules of an apparatus for presenting supplemental information, action, or both, with time-sequence data in accordance with the a embodiment;

- 20 Fig. 3 is a block diagram illustrating a variation of the apparatus according to the first embodiment shown in Fig. 2;
- 20 Fig. 4 is a graphical depiction of an exemplary application of the embodiments where a video is displayed on a monitor with a corresponding advertising banner;

- 25 Fig. 5 is a high-level flow diagram of a method of delivering supplemental information and/or action with time-sequence data in accordance with the first embodiment of the invention;

- 30 Fig. 6 is a flow diagram of a method of providing value-added content related to at least one of animation, audio and video data. in the process of presenting the animation, audio, and/or video data to a user in accordance with a second embodiment of the invention;

Fig. 7 is a flow diagram of a method of distributing advertisements with animation, audio and/or video data delivered for presentation by way of broadcast or streaming over a network in accordance with a third embodiment of the invention; and

- 5 Figs. 8A-8E are detailed flow diagrams of a method of presenting advertisements in association with video or movie in accordance with a fourth embodiment of the invention.

DETAILED DESCRIPTION

- 10 A method, apparatus and computer program product for linking supplementary information, actions, or both, to time-sequence (or "time-base) data is disclosed. The time-sequence data include animation, audio and/or video data. Fig. 1A is a timing diagram illustrating a linked combination 100 of time-sequence data 110 and supplemental information and/or action 120, 122, 124. Three portions 120, 122, 124
15 are linked for presentation with the time-sequence data. Essentially numerous forms of supplemental information and/or actions can be linked to the time-sequence data using the embodiments of the invention described herein. In addition to providing supplemental information, the embodiments can also provide "actions", which in broad terms denotes any additional functionality provided to the user. This can be
20 implemented as a computer program such as a Java applet that can be executed by a computer displaying time-sequence data. Exemplary actions include functionality for conducting surveys or for changing time-sequence data.

- Amongst other things, the embodiments enable video service providers such as cable
25 and broadcast television service providers to add controllably and on-the-fly added-value content to their video product by tightly linking advertisements to the subject-matter content of the video product. In this manner, the video with content-linked supplemental information and/or actions can be readily differentiated from normal broadcast video, for example. The same applies equally to audio and animation data.
30 The supplemental information and/or actions are provided via a network, preferably an electronic network such as the Internet or an Intranet.

Fig 1B is a timing diagram illustrating the linked relationship 150 between a video, animation and/or audio program 160 and four advertisements 162, 164, 166, 168. Additional advertisement content may be available at a remote location on a network and be accessed by a link (e.g. URL) in the advertisement. As shown, the estimation 150 includes overlapping advertisements, namely first and third advertisements 162 and 166 on the one hand and the second advertisement 164 on the other. One or more of the video, animation and/or audio data, the supplemental information and/or action, and linking mechanisms or controls for linking the content data with the supplemental information and/or action can be distributed via a network. Further, they may be obtained from two or more different sources on the network. Thus, for example, a video content provider can provide the video programming via the Internet from a first source site, the supplemental information and/or action from another source site, and the linking control database from yet another site. Other combinations are possible. For example, the video programming may be available locally at a user's location while the other components are delivered via a network, or vice versa.

With reference to the example of video delivered by broadcast or a network, the embodiments of the invention enable advertisements to be tightly linked in a programmable and on-the-fly manner to the content of the video. An advertisement can be displayed as a graphical banner in combination with the video presented on a display monitor. Fig. 4 is a depiction of an exemplary application 400 of the embodiments where a video 420 is displayed with a corresponding advertising banner 430. In this example, the video data 420 is displayed in a panel of the graphical operating system 410 (e.g. Microsoft Windows 95 or 98). The exemplary portion of the video 420 is currently displaying a well-known water fountain at Sentosa Island in Singapore. In conjunction with the video 420 being presented, an advertisement 430 is presented within the same panel. It will be readily appreciated that the advertisement 430 need not be presented in the same window. The advertisement 430 is presented as a banner referring to "Destination Sentosa: Experience it all..." A user can click on the banner 430 while it is displayed, and further supplemental information and/or

action can be obtained. For example, an advertisement 440 about Sentosa Island (shown in the background) can be retrieved via a URL of the banner 430 to download the advertisement 440 from a site on the Internet.

- 5 If the video is a film with actors and props, the advertisements can be directly linked to such video content. An advertiser can make direct reference in the advertisement to props in the video including articles of clothing, jewelry and accessories worn by particular actors in a scene. The advertiser can also make reference to items such as furniture, wallpaper and appliances. The foregoing applies to virtually anything visibly
10 and/or audibly perceptible in the video. Thus, the advertisement content-linked to the video can bring an item in the video to the viewer's attention and provide a way of making a purchase by the viewer using electronic commerce, for example.

- Again, the video can be streamed over an electronic network to a user's personal
15 computer with video display capabilities. By way of example, the video itself can be displayed in a window in a graphical operating system such as Microsoft Windows 95 (Trade Mark) running on a conventional personal computer, laptop computer, or work station. Also displayed in the window can be a banner or other graphical presentation containing information associating the banner with the content of the video.
- 20 Alternatively, the banner might be displayed in a separate window. By means of a textual reference, the banner can refer to a dress worn by an actress in the current video content as being sold by a particular advertiser. By appropriate interaction with the banner, the user can obtain further information about the dress or purchase it. The information obtained in this manner can be obtained remotely or in appropriate cases
25 locally. In one embodiment, the banner displays an HTML link to a remote site to which the user's personal computer is connectable by means of the Internet. From the advertiser's remote site, further information about the dress can be obtained including how to purchase it using electronic commerce or by telephone purchase.

- 30 In yet another illustration, a video track can be played on a display device such as a television receiver with touch-screen functionality. In conjunction with the television

receiver, a set topbox (associated with cable television services, for example) can be provided by which supplemental information and/or actions can be distributed. The functionality of such cable set topboxes are increasingly more sophisticated. An action can be displayed via the set topbox with the video on the television receiver, whereby

5 the relevant action can be chosen from a banner or the like displayed with the video. For example, the subject matter content of the displayed video can be a documentary about bears and include material on bears in Alaska. Where a segment about Alaskan bears is displayed, a banner displayed in association with the video can show a message indicating that a related program about Alaska is currently available for viewing. By

10 appropriate user interaction with the banner, such as touching an icon displayed in the banner, an action is carried out causing the displayed programming to change to the related program about Alaska without the user having to manually select the particular station.

15 In still another illustration, an audio track received by a tuner/receiver provided in a personal computer (e.g. Web radio) can be audibly output by the personal computer. In conjunction with the content of the audio segment, supplemental information and/or action can be displayed on the personal computer. The subject matter of the audio segment might involve discussion about some form of on-going audience survey, and

20 an appropriate prompt can be displayed on the personal computer dependent upon the audio content. By clicking on the prompt, the user can interactively participate in the survey over the Internet. Numerous other applications can be envisaged by those skilled in the art in view of the disclosure of the embodiments herein.

25 The embodiments of the invention are able to strongly link supplemental information and/or actions including advertising with the content of time-sequence data including animation, audio and video. Further, the embodiments of the invention enable flexible control of the flow of the supplemental information and/or action and its content. For example, the embodiments of the invention enable flexible control of the flow of

30 advertising in relation to an animation. audio and/or video sequence and the content of the advertising itself. Still further, the embodiments of the invention in particular

applications enable close linkage of electronic commerce with the content of the time-sequence data.

The embodiments of the invention are able to differentiate time-sequence data from
5 conventional broadcast time-sequence data by providing a content-based linkage with
the supplemental information, action or both. Further, the embodiments provide a
non-interfering mechanism for providing the supplemental information, action or both
with respect to both the time-sequence data itself and the delivery mechanism used to
deliver the time-sequence data. That is, no modification of the time-sequence data or
10 its delivery mechanism is required. All existing time-sequence data can be used. For
example, a video delivered on demand over a network to an end-user does not require
any modification and can be sourced from a digital video disc (DVD) without change
or embedding additional information prior to transmission. Still further, the
embodiments support customised and focused content-linking of supplemental
15 information, action, or both to the time-sequence data. This is particularly
advantageous where the supplemental information, action or both relates to
advertising. In addition, the embodiments of the invention enable full, on-the-fly or
"realtime" control over the content, sequencing and timing of the supplemental
information, action, or both, delivered to the user in conjunction with the time-
20 sequence data. Thus, advertisers for example can have full and realtime control over
the advertisement content. Customised advertising can therefore be supported.

As an example, embodiments of the invention permit a video program to be delivered
via a network on demand or on a pre-scheduled basis to viewers. Sponsors of the
25 program or advertisers can buy slots, both in terms of time-length as well as the time
position in the video program. During the time slots, the sponsor or advertiser can
provide HTML, XML, or other format advertisements that appear on the viewer's
display device (e.g. a personal computer). The sponsor or advertiser can have full
control over their advertisement content, whereas the advertisement length and
30 position can be pre-negotiated and controlled by the delivery service provide (e.g.
cable service provider). The sponsor or advertiser provides a URL from where their

advertisement content can be retrieved or downloaded. An advertisement delivered in this manner can provide a link to the sponsor's or advertiser's electronic commerce facility via a network or provide other means of conducting business. The latter might include providing a phone number to call for telephone transactions or the like.

- 5 Alternatively, a call centre can be contacted using video, audio or text communication.

Fig. 5 is a high-level flow diagram illustrating a method of delivering supplemental information, action, or both, with time-sequence data in accordance with a first embodiment of the invention. Processing commences in step 500. In step 502, time
10 sequence data is provided. Again, the time-sequence data can include one or more of animation, audio and video data or programming. The time-sequence data can be provided by broadcast or via a network. In step 504, supplemental information and/or action is provided separately from the time-sequence data. Examples of the supplemental information and/or action include a universal resource locator (URL) to a
15 remote site via a network, an interactive program, an icon, or an advertisement banner. In step 506, the supplemental information and/or action is linked with the time-sequence data during or immediately before playback of the time-sequence data. The supplemental information and/or action is preferably provided remotely via a network. The supplemental information and/or action can include a link to a remote location,
20 and in particular, a universal resource locator (URL). It can also include a displayed prompt with which user can interact by user input.

The supplemental information and/or action can be linked with the time-sequence data by means of a start time and a stop time, or a start time and a specified duration.

- 25 Alternatively, the supplemental information and/or action can be linked with the time-sequence data by means of annotation information associated with the time-sequence data. Still further, the supplemental information and/or action can be linked with the time-sequence data, which is dependent upon on-the-fly content analysis of the time-sequence data during playback of the latter. This may be done using any of a number
30 of known image/video/audio segmentation, recognition and analysis techniques well

known to those skilled in the art. Preferably, the supplemental information and/or action is content-linked with the time sequence data.

In step 508, the time-sequence data and the supplemental information and/or action is
5 presented to an audience. In the case of video and animation information, presentation
can be implemented using a display monitor of a personal computer, a television
receiver, a video monitor or the like. In the case of audio information, the audio data
(i.e. time sequence data) can be output by a personal computer (e.g. Web radio) or
other conventional sound reproduction devices for broadcast and network streamed
10 audio. The supplemental information and/or action can be presented on a personal
computer, a video monitor, or the like.

The time-sequence data and the supplemental information and/or action are linked by a
link. At least two of the link, the time-sequence data, and the supplemental
15 information and/or action can be initially co-located at their source. Alternatively, two
or more of the links, the time-sequence data, and the supplemental information and/or
action can be initially remotely located at one or more remote source locations of the
network. In step 510, processing terminates.

20 Preferably, the first embodiment of the invention depicted in Fig. 5 is implemented as
software or a computer program for presenting supplemental information and/or action
with time-sequence data. The software including a Java applet can be run on a
computer such as a personal computer or workstation, or Java virtual machine, for
example, well known to those skilled in the art. In particular, the computer program
25 can be recorded on a computer readable medium and used in combination with the
computer as a computer program product. The steps of Fig. 5 can be implemented as
modules of software containing operations or instructions to implement the
functionality. Alternatively, the functionality of Fig. 5 can be implemented
electronically (e.g. in an application specific integrated circuit ASIC). For example, it
30 can be embedded in a set top box for use with a video monitor or television receiver.
Numerous other applications will be readily appreciated by those skilled in the art in

view of the disclosure herein. The foregoing applies equally to further embodiments of the invention described hereinafter.

Fig. 2 is a block diagram illustrating the functional modules of an apparatus 200 for
5 presenting supplemental information, action, or both, with time-sequence data in
accordance with the first embodiment. Again, time-sequence data including video,
animation and/or audio data 210 are provided by broadcast or via an electronic
network. Alternatively, the data 210 may be provided locally. In addition, one or more
linking mechanisms 220 is provided separately from the time-sequence data 210. Two
10 or more linking mechanisms 220 are referred to in Fig. 2 as a database (DB) of linking
mechanisms. The linking mechanism database can be prepared by video, animation,
and/or audio content provider or the operator. Supplemental information and/or
action (or value added content) 230 is also provided. This can be HTML/XML/other
formats advertisements prepared and controlled by advertisers. Preferably, a linking
15 mechanism 220 is a predefined data structure containing parameters of particular
supplemental information and/or action 230 for presentation with a particular portion
of the time-base data 210. Preferably, the database 220 is database of advertisement
controls, and the supplemental information and/or action 230 is one or more
advertisements.

20 One or more of the video, animation and/or audio data 210, the supplemental
information and/or action 230 and linking mechanisms or controls 220 for linking the
content data 210 with the supplemental information and/or action 230 can be
distributed via one or more communication media 260. Further, they may be obtained
25 from two or more different sources such as two or more sites on the Internet, or the
video can be delivered via a cable television network. Other combinations are possible.
While single-headed arrows are depicted in Fig. 2, it will be reading appreciated from
the disclosure that communication between the components of Fig. 2 may be bi-
directional.

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The time-sequence data 210, link mechanisms 220 and supplemental information and/or action 230 are provided to a playback controller and/or interpreter PCI 240. The PCI 240 merges the video, animation and/or video data 210 and the supplemental information and/or action 230 for presentation on an appropriate presentation device
5 ("display") 250. Preferably, the PCI240 has a cache for storing linking mechanisms 220. It also preferably has a cache for storing supplemental information and/or action 230. Again, the apparatus 200 can be implemented using a general-purpose computer or electronically.

10 For example, during a video program delivered to the apparatus 200 via a network either on demand or on pre-scheduled basis to viewers, sponsors of the program or advertisers can buy advertising slots. The advertising slots can be both in terms of time-length as well as the time-position in the video program. The advertisers can present their HTML/XML/other-formats advertisements on a viewer's display 250.

15 Using a URL, advertisement content can be downloaded. An advertisement can provide a link to the advertiser's e-commerce facility, or provide other means of conducting business. This gives advertisers full-control over their advertisement content, while the advertisement length and position is pre-negotiated and controlled by the video service provider.

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Consider a video program that airs at 8:00 PM and finishes at 8:30 PM. For this program, advertisers can buy slots that are variable length in time. These slots can be displayed at fixed points in time during the broadcast of the program. An advertiser for watches might display a watch advertisement while a lead actor in the video
25 program is wearing the watch, which the advertiser wants to sell to the viewers. At the same time, another advertiser for suits display a clothing advertisement, which might be longer or shorter than the watch advertisement. For on-demand type scenarios, the start time of the advertisements is with respect to the beginning of the program rather than in absolute time. The advertiser can get charged by the service
30 provider based on a number of factors, including the length of the advertisement slot.

the placement of an advertisement during the program, and whether or not the slot is shared with someone.

An example entry in the linking mechanism database or advertisement control database is:

Start-time: 00:05:00

End-time: 00:06:00

Address: <http://www.watchesRus.com/advert/>

During the broadcast, the PCI 240 displays the video information 210 and starts interpreting the advertisement control 220. At a specified start time for a particular advertisement, the PCI 240 fetches the advertisement content from the specified address, which is defined in the advertisement control 220 along with the timing information. Alternatively, the embodiment can be practiced using annotation to link the data 210 with the supplemental information and/or action 230. The advertisement content is displayed using the display or presentation device 250 (or the advertisement content can also be pre-fetched). The PCI 240 stops the display of the advertisement content when its duration has expired.

The format of the linking mechanism database or advertisement control database 220 has a format designed to be easy to produce, modify and maintain. It should also be efficient for transmission purposes and be extensible. Exemplary fields for the format are:

Period of advert display (from date – to date, which days)

Start time – End time (in minutes:seconds)

Size of advert on display (in inches)

Location of advert on display (llc, lrc, urc, ulc, center etc)

Address of advertisement content (URL)

Since the PCI 240 executes the database of linking mechanisms or advertisement control database 220, the PCI 240 is developed hand-in-hand with the format of a

linking mechanism or advertisement control. In addition, so that more features can be added to the PCI 240, the PCI 240 should be well structured and extensible.

When a video, animation and/or audio program 210 starts, the address of the link
5 mechanism database or the advertisement control database 220 is transmitted with the initialization information.

Fig. 3 is a block diagram illustrating a variation 300 of the apparatus 200 shown in Fig. 2. For purposes of brevity, like features in Figs. 2 and 3 are identified with the same
10 reference numerals. Only differing elements or features are identified with numerals of the format 3XX. In particular, video, animation and audio 210 is provided to an on-the-fly content analyser 310 forming part of the apparatus 300. The content analyser 310 is connected to the PCI 240, and preferably forms part of the PCI 240. The content analyser 310 can be used to determine the linking of the supplemental
15 information and/or action with the video, animation and/or audio data 210, either entirely on its own or in combination with the linking mechanisms 220. A dashed-line arrow extends between the communication media 260 and the content analyser 310. This arrow indicates that optionally the video, animation and/or audio data 210 can be delivered directly to the content analyser 310 without passing through the PCI 240
20 first. This might be done where the content analyser operates completely independently or to reducing data processing via the PCI 240 to the content analyser 310.

Fig. 6 is a flow diagram of a method of providing value-added content related to at
25 least one of animation, audio and video data, in the process of presenting the animation, audio, and/or video data to a user in accordance with a second embodiment of the invention. Processing commences in step 600. In step 602, animation, audio, and/or video data or programming is delivered for presentation to a user. In step 604, the value-added content is provided separately from the animation, audio and/or video
30 data. The value-added content is preferably an advertisement and can include a universal resource locator (URL). However, as described above in terms of the

supplemental information and/or action, the value-added content can include additional functionality, services and information. Alternatively, or in addition, the value-added content may include a set of instructions for performing operations on a local apparatus or a remote apparatus linked with the local apparatus by a network. The
5 local apparatus can be a personal computer or the like connected to the Internet, and the remote apparatus can be a site on the Internet.

In step 606, a linking mechanism or structure is provided, separate from the animation, audio, and/or video data, which can link the value-added content with the animation,
10 audio, and/or video data in a controllable and on-the-fly manner prior to presentation of the animation, audio, and/or video data and the value-added content. The linking mechanism can include a start time and a stop time of the value-added content in relation to the animation, audio, and/or video data, as well as an indicator of the location of the value-added content. Alternatively, the linking mechanism can include
15 an annotation associated with the animation, audio, and/or video data. More preferably, the linking mechanism is dependent upon the content the animation, audio, and/or video data.

In step 608, the animation, audio, and/or video data and the value-added content are
20 presented to the user. The value-added content can be presented separately in a device for reproducing the animation, audio and/or video data, such as a television or video monitor. Alternatively, it can be presented in or on the animation, audio and video data in a device for reproducing the animation, audio and video data. Processing terminates in step 610.

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As described in relation to the first embodiment, the process of Fig. 6 can be implemented as an apparatus and/or a computer program product.

Fig. 7 is a flow diagram of a method of distributing advertisements with animation,
30 audio and/or video data delivered for presentation by way of broadcast or streaming over a network in accordance with a third embodiment of the invention. Processing

commences in step 700. In step 702, animation, audio and/or video data is delivered for presentation. In step 704, an advertisement related to the animation, audio and/or video data is provided separately. Preferably, the advertisement is capable of connecting a user with a remote location via a network by user interaction with the advertisement. In step 706, one or more advertisement control links are provided for linking separate advertisements with the animation, audio and/or video data. In step 708, the advertisement is presented to a user during presentation of the animation, audio and/or video data dependent upon the advertisement control link. Optionally, the method includes a step (not shown) of vending a product or service by means of electronic commerce or contacting a call centre dependent upon the advertisement. Processing terminates in step 710.

Figs. 8A to 8E are a detailed flow diagram of a method of displaying advertisements in association with a movie or video in accordance with a fourth embodiment of the invention. The flow diagram illustrates many specific details, however, those skilled in the art will appreciate that numerous changes can be made to the process without departing from the scope and spirit of the invention. Likewise, while detailed steps of a process involving video or movies is set forth, the process can be readily adapted for application in relation to audio and/or animation data in view of the disclosure herein.

With reference to Fig. 8A, processing commences in step 800. In step 802, an identifier (e.g. a title) of a movie or video is read, and the sources of the movie/video and the advertisement control database are determined. In step 804, the advertisement control database is opened. In step 806, a panel in a graphical computing environment (e.g. Microsoft Windows 98) for displaying an advertisement is created, and the current list of advertisements is set to null. In step 808, a panel is also created for displaying the movie or video. The movie preferably plays in this panel as a separate thread. After step 808, three separate threads are carried out preferably substantially in parallel by the operating system. In Fig. 8A, the separate threads are denoted by connectors A, B and C corresponding to Figs. 8B, 8C, and 8D, respectively.

Fig. 8B is a flow diagram of a thread for handling incoming advertisement controls and advertisements. The advertisement controls and advertisements are streamed for presentation of the advertisements to a viewer. In step 812, the media time of the movie is obtained from the media player. In step 814, a cache storing advertisement controls is updated. In step 816, the locations of new advertisements are obtained from the updated advertisement control data cache. In step 818, the advertisement cache is updated by streaming the advertisements for the current portion of the movie playing and for an additional predefined period yet to be played. In decision block 820, a check is made to determine if the advertisement update thread (Fig. 8C) or the movie playing thread has ended. If decision block 820 returns false (NO), processing continues at step 812. Otherwise, if decision block 820 returns true (YES), the thread terminates in step 822.

The process of Fig. 8B can be readily implemented for handling the use of annotations to link the advertisements and the movie. The annotations of the movie can be obtained for the currently playing portion of the movie and a few annotations read ahead for a portion(s) of the movie yet to be played. The annotations in the movie are then matched with the annotations of the advertisements in the advertisement control data cache. The locations of the advertisements are determined in this manner. The advertisements are then streamed to update the advertisement cache.

Fig. 8C is a flow diagram of the process of presenting advertisements while a movie is playing. In particular, the advertisements are updated. In step 826, the media time of the player presenting the movie is read. In step 828, using the media time, a start time and an end time of a current advertisement(s), a check is made to determine if any advertisements have to be removed. This step can be readily modified to handle the case where annotation is used to link advertisements with the movie. This involves comparing the annotation of the movie with the annotation of the advertisement. The advertisement is to be played for the duration of the matching movie annotation. Decision block 830 determines this result. If decision block 830 returns false (NO), processing continues at step 834. Otherwise, if decision block 830 returns true (YES),

the advertisement being processed is removed from the advertisement panel created in step 806. Processing then continues in step 834.

In step 834, using the media time, advertisements are selected from the advertisement
5 cache to be made current. In decision block 836, a check is made to determine if any
advertisements should be added for presentation. If decision block 836 returns false
(NO), processing continues at decision block 840. Otherwise, if decision block 836
returns (YES), processing continues at step 838. In step 838, the advertisement is
added to the advertisement panel created in step 806 for presentation. Processing
10 continues at decision block 838. In decision block 840, a check is made to determine if
the movie has ended or if the user has stopped play. If decision block 840 returns false
(NO), processing continues at step 826. Otherwise, if decision block 840 returns true
(YES), processing continues at step 842. In step 842, the player software application
is closed or terminated and the advertisement control database is closed. Processing of
15 this thread terminates in step 844.

Fig. 8D is a flow diagram of the process of playing a movie. In step 848, user inputs
including fast forward, rewind, etc., are received and responded to by the player. In
decision block 850, a check is made to determine if the end of the movie has been
20 reached or it has been user terminated. If decision block 850 returns false (NO),
processing continues at step 848. Otherwise, if decision block 850 returns true (YES),
the thread terminates in step 852.

Fig. 8E is a flow diagram illustrating the processing of interactive user input in relation
25 to a playing advertisement. Processing commences in step 870. In step 874, input can
be received from a user. In step 876, the thread responds to the user input and
performs an appropriate action as defined in the advertisement control database for the
advertisement. In decision block 878, a check is made to determine if the
advertisement has been removed from the advertisement panel. If decision block 878
30 returns false (NO), processing continues at step 874. Otherwise, if decision block 878
returns true (YES), the thread terminates in step 880.

Thus, Figs. 8A-8E provide specific implementation details of one particular application of the fourth embodiment in relation to movie or video data. The process can be practiced with readily apparent changes in view of the disclosure for processing
5 animation and/or audio data. This embodiment is able to strongly link advertising with the content of animation, audio and/or video data. In particular, it enables flexible control of the flow of the advertisement and the advertisement content. Importantly, the process of Figs. 8A-8E provides the advertisement for presentation to a user without requiring any modification of the movie itself and the delivery mechanism used
10 to deliver the movie. The fourth embodiment enables customised and focused content-linking of advertising to the time-sequence data.

The foregoing embodiments of the invention disclose a method, apparatus and computer program product for linking supplementary information, actions, or both, to
15 time-sequence data dependent upon the content of the time-sequence data. The time-sequence data include animation, audio and/or video data. Only a small number of embodiments have been disclosed by way of example. However, those skilled in the art will recognise that the invention can be practiced, with modification, in the light of the information contained herein without departing from the scope and spirit of the
20 invention.